

## Plate cooler of metallurgical furnace

The present utility model relates to a plate cooler of metallurgical furnace, especially of a blast furnace.

In modern metallurgical furnaces, also in blast furnaces, one of two types of coolers are used for cooling masonry envelope of the furnace. The first type comprises vertical coolers with cast iron casing, with cooling coil embedded inside it, installed along furnace shell. The other type comprises horizontal cooling boxes made of copper, and inserted through openings in the shell deep into the masonry envelope.

Both types of coolers have their respective advantages and drawbacks. The first have a big mass, they cool evenly the masonry envelope of the furnace and protect the shell against overheating. Their drawback consists in low resistance of cast iron casing to thermal shocks, and relatively limited efficiency of heat abstraction from the masonry envelope.

Horizontal copper coolers in form of flat boxes used for furnace envelope create local cooling areas of the envelope, and after partial destruction of said envelope they create so called "serrated" surfaces of furnace walls, hindering correct sliding down of the charge.

The cooler according to the utility model is free of drawbacks of known solutions while keeping their advantages. The cooler according to the model comprises a casing made of copper, in which tubes are located in five parallel rows, said tubes running to the outside through bushings, and perpendicularly to the surface of the casing, mounting holes are located between tubes.

The subject of utility model is shown in the drawing, in which fig. 1 shows a top view of the cooler, fig. 2 shows a cross section of the radiator taken along line A-A in fig. 1, and fig. 3 shows a side view of the cooler. The cooler according to the model comprises the casing 1 made of copper, in which tubes 2 are located. The tubes 2 are prepared before execution of the radiator and they flooded with copper, making the casing 1. Tubes 2 run to the outside of the casing 1 through bushings 3. Tubes 2 are disposed in five parallel rows, supplied with water during cooler operation. Perpendicularly to the casing 1, and between tubes 2, mounting holes 4 are located, used for securing the cooler to furnace shell.

The cooler made according to the invention has the advantages of vertical cast-iron cooler and of copper cooling box. The casing made of copper having comparatively big mass, effectively transfers the heat via its whole volume to the water flowing inside it.

Casings of coolers according to the invention are resistant to thermal shocks, and at intensive water flow transfer considerably larger heat fluxes than existing radiators with cast iron casings. Installed along furnace shell, they evenly cool the masonry envelope and protect the shell against overheating.

## Claims

Plate cooler of metallurgical furnace, especially of blast furnace, characterised in that it comprises the casing 1 made of copper, in which tubes 2 are located in five parallel rows, running to the outside through bushings 3, and perpendicularly to the surface of casing 1, mounting holes 4 are located between tubes 2.

